

account the author calls them *binary*, a term which applies to the numerous class of phenomena which he has observed by a great variety of combinations. He reckons as many as six kinds of rectilinear bands produced in his experiments which have not been noticed by any other writer.

In order to ascertain what effect the presence of air might have on these phenomena, the author repeated some of his experiments in vacuo, and found that the removal of the air had no perceptible effect.

Even the interposition of water between the surfaces appears to him to diminish but little the brilliancy of the colours. Nitric acid has more effect; and in fluids of greater density, as olive oil, the whole class of phenomena disappear.

It appears somewhat strange, says Mr. Knox, that Newton should have attributed the coloured rings to a plate of air and to supposititious fits of easy reflection and refraction, when a cause more obvious was at hand; namely, the interference of the reflecting and refracting strata diffused over the contiguous surfaces: for it may be supposed, that when a ray passing out of glass into air is interrupted and receives a new impulse by the influence of a second refracting medium, these contrary impulses may be repeated many times, and by repeated vibration may affect the rays according to their different refrangibility, so as to separate them into differently coloured spectra. He therefore thinks it highly probable, that by this compound action and reaction between the strata and light, and between the rays of light themselves, all the various phenomena are produced, although from their extreme minuteness an accurate knowledge of the mode of operation is not to be expected.

Some farther Observations on the Current that often prevails to the Westward of the Scilly Islands. By James Rennell, Esq. F.R.S.
Read April 13, 1815. [*Phil. Trans.* 1815, p. 182.]

In the course of twenty-one years that have elapsed since the author's original communication on this subject was published in our Transactions, he has collected many new instances of the effects of the current, tending to confirm the general observations respecting its course from Cape Finisterre to Scilly, and affording clearer proof of the strength of the stream than any evidence that he could adduce on the former occasion. The first fact relates to its commencement in an easterly direction, toward Cape Finisterre, from a distance of at least fifty-three leagues, in the instance of the Earl Cornwallis Indiaman, which drifted in that direction at the rate of twenty-six miles per day.

In the second instance, a bottle thrown out by a Danish navigator was carried in a direction E. by S. to Cape Ortegal, a distance of sixty-four leagues.

A third fact was communicated to the author by Admiral Knight.

who found a current at the rate of one mile per hour, setting nearly along shore on the north coast of Spain.

With respect to the progress of the current which thus evidently sets along the southern side of the Bay of Biscay, the author has not been able to procure any further evidence directly showing its continuance round the Bay; but he observes that the soundings evidently show that the mud of the Garonne, Charante, Loire, &c., on the west coast of France, is all carried to the northward; and that the openings of these rivers evidently point in that direction in consequence of the current that sets across their mouths.

With regard to the further progress of the same current to the northward along the coast of France, direct evidence is again obtained in the instance of H. M. S. Russel, which was carried seventy miles to the N.W. by an unexpected current in that direction.

In addition to these facts, which are of comparatively recent occurrence, the author finds that the generally observed and well-known flow of the tides on the west of Scilly, cannot well be accounted for but by the supposition of a current setting in from the southward, which causes the flood tide to run nine hours northward, while the ebb in the opposite direction lasts only three hours.

Major Rennell has also recourse for evidence to two publications which have but recently come to his knowledge, though printed so long since as 1733 and 1757. In Joshua Kelly's *Treatise on Navigation*, of the former date, an instance is related of a West Indiaman drifted, during two days of dead calm, forty-six miles northward, across the mouth of the British Channel.

Captain Mead also, in relating the case of the ship *Hope* of Liverpool, in 1735, mentions her having been drifted forty-eight miles to the northward of her expected course, by the same current which he represents as an indraught into St. George's Channel; and says it was well known to the Bristol men in making for their Channel, and that accordingly they made allowance in their bearing of 4° or 5° for that indraught.

The author takes this occasion to notice another current, setting to the north-eastward across St. George's Channel into Cardigan Bay, which sometimes endangers the safety of vessels in their passage from the Land's End to Dublin.

This may partly arise from the tail of the Scilly current having an easterly set, in consequence of meeting the S.E. coast of Ireland; but in the author's estimation is more likely to originate from a cause similar to that of the Scilly current itself, in consequence of the south-westerly winds carrying a heavy sea along that coast from Cape Clear to Carnsore Point.